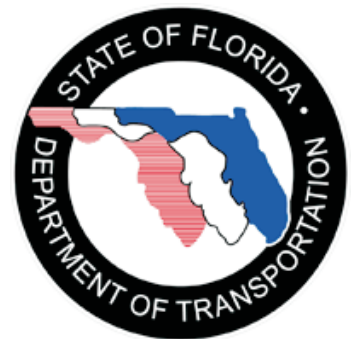




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Work Order 4- SERPM Enhancements Model Support Memorandum: SERPM 6.5.2 Model Enhancements

Districtwide Demand Forecast Model Development - Systems Planning Projects
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BACKGROUND

SERPM 6.5 is in the process of testing for use on a variety of projects in the southeast Florida region. In the course of applications, users have reported some erroneous results and opportunities to improve the overall user experience applying the model for specific analyses. To address these issues, FDOT District 4 has made some changes to the model. The reported issues, findings and resolutions are briefly described below.

DEFAULT SETTINGS

Reported Issue

The default settings for alternatives could be modified to simplify execution of the model.

Findings

By default, the “Use Cube Cluster” was not checked on.

Resolution

The default value is now checked (true) to use Cube Cluster on model startup. Further, the default value of “Delete Temporary Outputs if Model Runs Successfully” is also set to checked (true). The “HIGHWAY ONLY” option default value (discussed later in this memorandum) is set to unchecked (false).

2035 DATASETS

Reported Issue

Some highway and transit network coding errors are known to be in the 2035 datasets for Miami-Dade County. The Miami-Dade MPO would like those errata addressed before the next release of the model.

Findings

Highway and transit network coding errors were found in the Miami-Dade portion of the SERPM 2035 networks.

Resolution

Known errors in the 2035 highway and transit networks have been corrected.

HIGHWAY EVALUATION (HEVAL) DIFFERENCES

Reported Issue

The SERPM TOD and SUBAREA model’s HEVAL process and parameters have differences.

Findings

The FORTRAN version of HEVAL used by the SUBAREA model was found to be dated.

Resolution

The scripted version of HEVAL from the SERPM TOD model has been introduced to the SERPM652 release. This also required updates to the HIGHWAY ASSIGNMENT model to generate variables needed for the scripted HEVAL. The SERPM TOD highway assignment procedures have been introduced to SERPM652 to insure 100% attribute compatibility.

CAPACITY CALCULATOR

Reported Issue

The SERPM TOD and SUBAREA model's Capacity Calculator process and parameters have differences.

Findings

The SUBAREA version of SERPM's the Capacity Calculator was found to be dated.

Resolution

The Capacity Calculator from the SERPM TOD model has been introduced to the SERPM652 release.

TRIP DISTRIBUTION DIFFERENCES

Reported Issue

The SERPM 65 trip distribution model does not converge for some trip purposes. When distributed using Cube Cluster, the results can vary depending on which trip purposes are distributed to which processors.

Findings

By processing 1 purpose at a time, stability of results was assured. However, this approach yielded unacceptably different results than the originally validated model.

Resolution

The convergence criterion for all DISTRIBUTION procedures is set to a more stringent maximum RMSE value of 0.000001. This forces all trip purposes to continue to iterate to the maximum iterations set for the trip distribution model (40). This does increase runtime for purposes that would converge before meeting a less stringent maximum RMSE. However, given that many purposes do not converge given those less stringent criteria, the increase in run time should be negligible for most users.

OUTPUT DIRECTORIES

Reported Issue

Before testing a new alternative, a user would need to manually create subdirectories for some output files.

Findings

While this process did not introduce errors in the model, it did require the user to have unnecessary knowledge and to take the time to set up the output directory structure.

Resolution

Commands were introduced to the initial PILOT step to create the output directories necessary for any given alternative. These are processed by the "CREATEDIR.BAT" file.

AMBIGUITY IN USER INTERFACE (SCENARIO MANAGER)

Reported Issue

Some of the choices in the menu system were less than clear to the user in how these choices would impact model run times and results.

Findings

The descriptions and configuration of the user interface could be improved.

Resolution

The Subarea and Districting menu choices and associated descriptions have been modified to better explain how to use those options.

SUBAREA NETWORK PROCESSING

Reported Issue

The process to create a subarea network required a two step process to identify the subarea of interest.

Findings

This issue does not impact model results but does make the subarea process a bit more complicated than it has to be.

Resolution

The two steps/calculations necessary to execute the subarea model have been reduced to 1. The user now needs to identify/calculate an attribute on the NODE feature only. Any link connected to a node with the DETAIL=1 will automatically be selected for subarea analysis. The user interface has been revised accordingly to reflect the simplified instructions.

HIGHWAY ONLY OPTION

Reported Issue

There have been many versions of SERPM that have desirable features, one of which is the HIGHWAY ONLY. This way of executing the model is desirable as it reduces run time and does not require the user to interface with the transit model when creating/managing alternatives.

Findings

It is possible to introduce a HIGHWAY ONLY option to the user interface that would bypass certain model procedures. There are many ways of processing this in the model each of which has various tradeoffs.

Resolution

A “challenge” with creating a HIGHWAY ONLY version of SERPM is that the latest version includes a trip distribution step for transit dependent households. Further the last run of the mode choice model requires transit LOS tables in order to calculate the appropriate shares for the auto and transit modes given the input LOS (highway and transit). In short, transit is integral to SERPM’s design.

To insure “integrity of the process” and to try to achieve as much parity with the “FULL TRANSIT” run as possible while simultaneously trying to minimize run times, a copy of the 2005 “R” alternative’s “base” transit skims are stored in a directory {Catalog Dir}\HWYONLY for use in a HIGHWAY ONLY run.

When the HIGHWAY ONLY option is selected, the job stream copies these files into the working directory of the current alternative and names them appropriately. These skims are then used for mode choice and other purposes as needed in the job stream. HIGHWAY skims remain a product of the current run/alternative. In this way, model sensitivities are maintained, run times are reduced by the amount of time used by the transit path builder / transit assignment, and any changes in trip generation, trip distribution or highway LOS are reflected in the final results.

By storing these files as part of the SERPM652 datasets, the user does not need to generate them on their own as part of the model installation. However, this does increase the overall size of the installer from approximately 125mb to 603mb.

DISTRIBUTED PROCESSING

Reported Issue

The multi-step distributed processing in highway assignment could not take advantage of more than 4 cores.

Findings

This issue does not impact model results but does increase run times on machines with more than 4 cores.

Resolution

The multi-step processes were replaced with intra-step procedures for highway assignment.

